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Ref:

As requested in reference, we are forwarding a copy of the briefing on the Soviet computers. A more detailed technical report is in process and should be completed during the next month. When it is available, it will be forwarded to you also.

Distribution:

Enclosure: "Computers in the Soviet Economy"

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S-2055 (DCI Briefing)
25 November 1966

COMPUTERS IN THE SOVIET ECONOMY

For a number of years Soviet economists have been saying that cybernetics and computers can be used together to solve many of their economic problems. In some ways it might seem that the centrally-controlled economy and the computer were tailor-made for one another. But in fact, the Soviet economy today depends more on the abacus and the hand calculator than it does on the modern computer. The USSR lags badly behind most industrial nations in the use of computers. As shown in Chart I, the US had installed its first thousand computers about eight years ahead of the USSR and now has ten times as many computers in use. Even Western Europe has twice as many computers in operation as the Soviet Union.

Computers have revolutionized the processing of economic and business data in the US during the past ten years, and have more than paid for themselves by reduction in costs. The potential for applying computers in the Soviet economy is equally great, but the USSR is years away from the pay-off that the American economy has already realized. The major reason for the Soviet lag is that the USSR has used most of its computers in military and scientific work and has barely scratched the surface in economic applications.

Chart II shows how the US and USSR have allocated their computers. Whereas the US employs nearly 60% of its large inventory in the economy and only about 40% in military and scientific work, the USSR now uses less than 15% of its computers in the economy. The Soviet Union is using a system of processing economic data that has hardly been changed in the last 40 years. About 3 million people are engaged in this paperwork system in which hand operations predominate; fewer than 500 outdated computers are used in the economic data system. By contrast, the US has automated large chunks of its economic data base with the aid of about 20,000 computers.

Soviet planners and writers are well aware of the defects in their economic data system. This was dramatized by Soviet academician Glushkov, who said that by 1980, under the present system, the volume of paperwork will have increased by 3,600% and the entire population of the USSR will then be needed to compile and analyze economic data. Soviet planners hope to replace their present cumbersome methods with a national network of computers, which would enable them to process data and solve problems more rapidly and efficiently at a great saving in labor. They face major problems in working toward this goal. The tasks before them are summarized in Chart III.

1. Install Several Thousand Modern Computers

Existing Soviet computers for economic data processing are crude by US standards. Most Soviet machines are designed for military

and scientific work and are not as useful for large-scale data processing. What the Soviets need for large-scale economic work is the current line of American machines capable of over 1 million instructions per second and with storage capacity in excess of 10 million words.* What they have for data processing is typified by the URAL-16, a machine capable of 80,000 instructions per second and with storage capacity of 130,000 words. Their very best and newest machine, the BESM-6, is capable of 1 million instructions per second, but was designed for scientific rather than economic uses.

The Soviets are even further behind in the equipment that accompanies the basic computer and makes it more useful. They use punched cards as direct input to computers, a process considered much too slow in the US today. They use outdated methods to store their data, and their page and line printers are relatively slow. Much of their equipment is of low reliability. Because of these shortcomings they often cannot use their computers as efficiently as we do.

2. Train Thousands of Computer Specialists

Computer manufactures in the US have been highly successful because they service what they sell. In addition to installing the machine, they often keep full-time representatives on the premises to maintain it. By contrast, Soviet computer manufactures have badly neglected their customers. They usually just hook up the machine and

* Such as the IBM 360/65.

identify its parts, and then are never heard from again. The user is forced to experiment, to do his own repairs, to make his own spare parts -- and in the process he may change the operating characteristics of the computer so that he cannot share programs with other users of the same model. As an example of these difficulties, the Soviets reported that in 1965 there were 40 delivered but unassembled computers in the Ukraine and the computers that were in operation were idle one-third of the time.

The supply of programmers, operators, repairmen, and other computer specialists in the USSR is far below demand. Production of computers is increasing about 30% annually, and training of personnel must expand even faster if the deficit is to be overcome.

The tremendous growth of computers in the US and Western Europe is due in part to the widespread use of programming languages. These languages resemble a form of pidgin English and are used to tell the computer what to do. Although the languages are developed by skilled mathematicians, they can be taught quite easily to bright high school graduates. The use of languages results in great savings in time and money. However, programming languages are in their infancy in the USSR and have been used with only a few machines. Before the Soviets can employ computers on a mass scale in economic data processing, they will be forced to develop programming languages and to train thousands of programmers.

3. Develop an Elaborate Communications System

In order to use a nationwide network of computers that can handle most economic data and assist with planning, the Soviets must build a communications network more comprehensive than any now in existence. Eventually they hope to have each plant or enterprise connected with a regional computer center, which in turn will be connected with other regional centers and with a national computer center in Moscow. Ideally, a person operating a remote console anywhere in the USSR should then be able to obtain data directly and almost immediately from any of the regional centers in the nation. This will require a vast, flexible communications system that the Soviets probably could not develop for more than a decade.

4. Revise the Economic Reporting System

The Soviets must revise their methods of economic reporting if they expect to automate their planning and statistical systems. Today there are several parallel information systems that impose separate burdens on the plant manager. There is redundant reporting of data into each system, with little effort at standardization. For example, different reporting systems use different stock numbers for identical items, which makes it difficult for them to exchange data with one another.

Soviet writers recognize that the economy faces a major information crisis and that they must make sweeping changes before

they can use computers on a large scale. The Soviet economist Federenko summarized the current problems as follows: "The economic reporting system (consists) of data collected by the statistical agency and by means of a great number of telephone conversations and meetings. Of these data, collected with a great delay, no more than 10% are used for purposes of planning. Relying on such a system, the organs of planning often cannot formulate scientifically based plans even when using computers and modern scientific methods..."

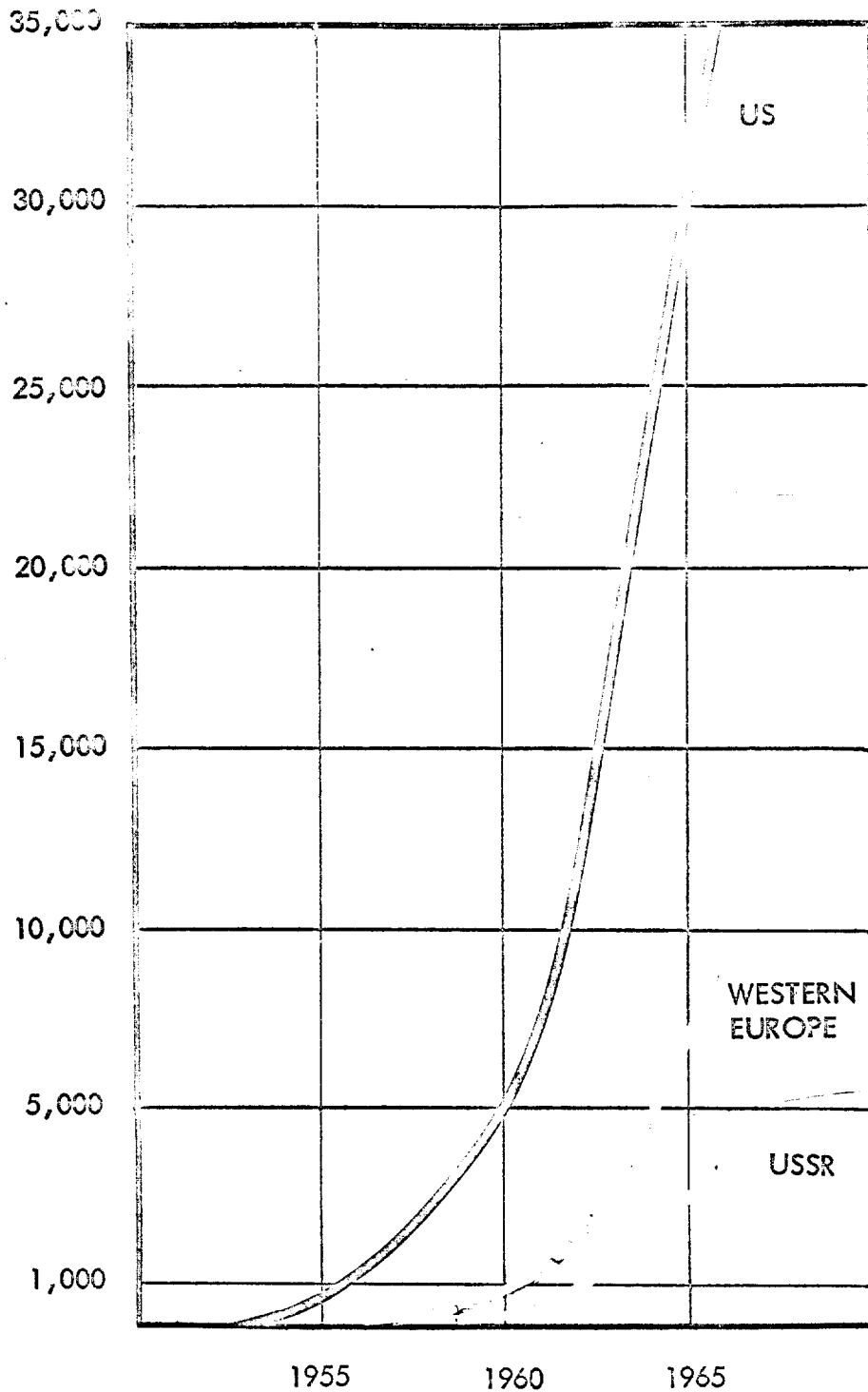
5. Educate Enterprise Managers

Finally, many enterprise managers are dragging their heels in the government's effort to introduce new technology, including computers. They often have no incentive to change old ideas, and they find ways of postponing new ones. The USSR is now beginning to use computers in a variety of activities; for example, to route trains and aircraft, to find the most profitable location for new cement plants, to control construction projects, and to help solve problems in agriculture. But most of this work is still in the experimental stage, and widespread applications cannot be expected for a number of years. Only when enterprise managers have been educated in the benefits of the computer will they be enthusiastic about its use.

The directives of the new Soviet Five Year Plan for 1966-70 give major emphasis to increasing production of computers that are

able to handle large amounts of economic data. At the same time, Soviet economists are pushing their research to develop mathematical models of the economy. But the planners realize that there is an enormous amount of work to be done and that only a small part will be accomplished in the next five years. It will be well into the 1970's before the national network of computers can begin to relieve the burden of paperwork and to help solve problems for the plant manager.

COMPARISON OF US, USSR, and WESTERN EUROPE



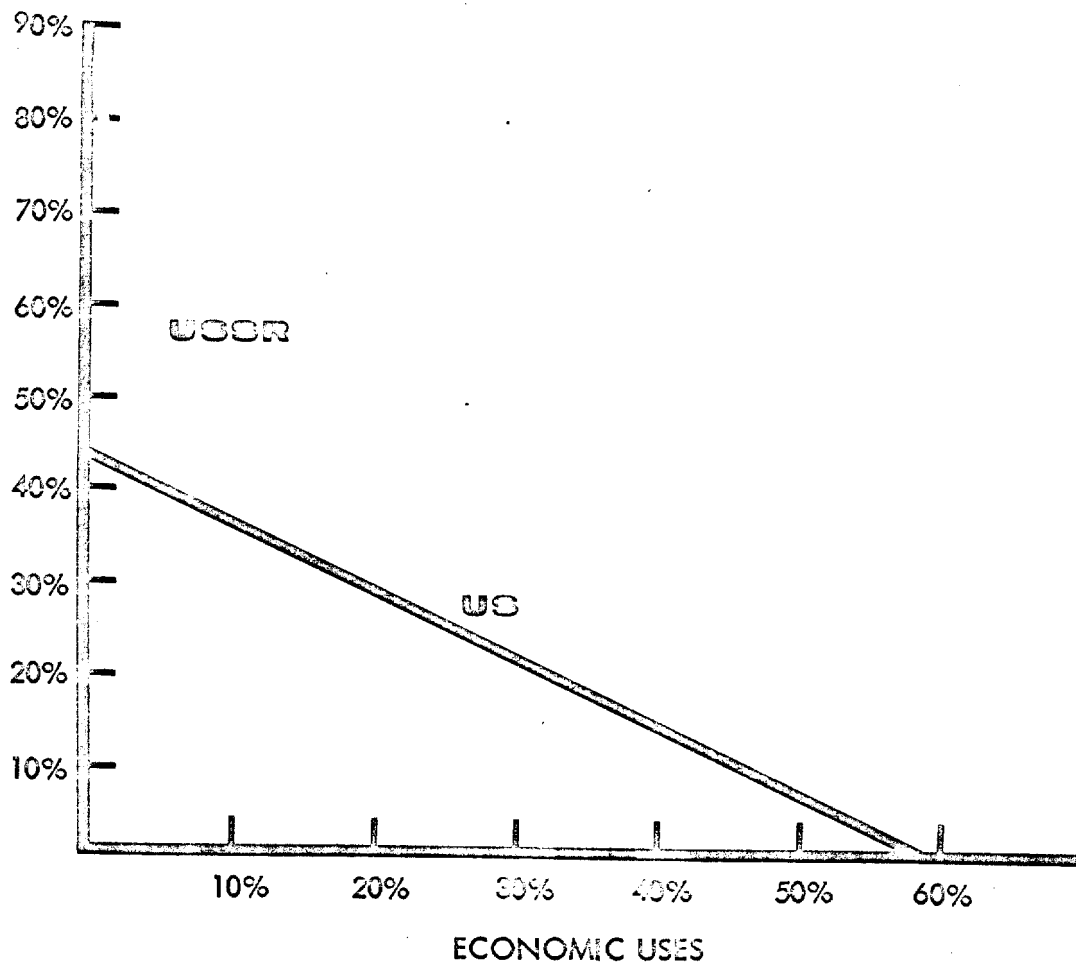
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DISTRIBUTION of COMPUTERS

in percent of total

US, and USSR, 1966

MILITARY AND
SCIENTIFIC USES



TO COMPUTERIZE THEIR ECONOMY SOVIET PLANNERS MUST—

- INSTALL SEVERAL THOUSAND MODERN COMPUTERS
- TRAIN THOUSANDS OF COMPUTER SPECIALISTS
- DEVELOP AN ELABORATE COMMUNICATIONS SYSTEM
- REVISE ECONOMIC REPORTING SYSTEM
- EDUCATE ENTERPRISE MANAGERS

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